with the late weight gain in stapled patients. A procedure of gastric wrapping and placing of a nonabsorbable, permanent restricting sleeve around the stomach appears to have some advantages. The stomach is not penetrated, or sutured, thereby diminishing some of the early morbidities sometimes seen with the more invasive gastric techniques. The procedure is permanent and not associated with late weight gain.

With the gastric-reduction procedures, there do not appear to be the metabolic side effects that so often attended the earlier intestinal bypass procedures.

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Limb Salvage for Soft Tissue Sarcoma of the Extremities

SOFT TISSUE sarcomas of the extremities are unusual malignant tumors. Fewer than 4,000 cases of such tumors are treated annually in the United States. Amputation has been the standard therapy. In theory, amputation should be done one joint above the anatomic region involved by the sarcoma. In practice, however, even radical amputations such as hemipelvectomy or intrascapular thoracic amputation for large proximal lesions often result in close margins. Despite these radical amputations, the local recurrence rate can be as high as 10% with amputation alone.

Early attempts to surgically treat cases of soft tissue sarcoma by less than amputation resulted in high local failure rates. Local excision or enucleation of a tumor invariably cut through microscopic areas of disease. Soft tissue sarcoma appears grossly to be encapsulated. However, this "pseudocapsule" is composed of compressed normal tissue infiltrated by malignant cells. The enucleation or local excision leaves viable tumor cells in situ and will almost always lead to local recurrence.

Excision or compartmental resection can be successful in treating some patients with soft tissue sarcoma in an extremity. The theory of compartmental resection is to remove the entire involved muscle compartment from origin to insertion. In practice, this is often difficult because sarcomas are rarely confined to one muscle group. Most tumors cross several fascial planes and the tumor's site of origin remains obscure. Wide excision removes the tumor and a rim of normal tissue in an attempt to avoid transection of microscopic disease. Local recurrence after wide excision or compartmental resection may be as high as from 30% to 40%.

The development of radiotherapy has resulted in successful alternatives to amputation. Irradiation alone is inadequate to treat gross disease and must be combined with surgical resection to avoid dose-related complications or local recurrence. Irradiation is more likely to be effective when no gross disease remains. Resection of the tumor and postoperative radiotherapy are extremely successful for sarcomas located distal to the elbow or knee. Large, more proximal tumors cannot usually be successfully treated with resection and radiotherapy.

The addition of chemotherapy to the management of a primary tumor on an extremity has achieved local control rates at least as low as those of radical amputation. We infuse doxorubicin hydrochloride intraarterially because it is a known irradiation sensitizer. After three days of chemotherapy (total dose, 90 mg) a patient receives 3,500 rads of radiotherapy preoperatively over ten days. This rapid fractionation of radiotherapy results in few complications and is biologically equivalent to 5,000 rads. The tumor is then excised with a rim of surrounding normal tissue, liberally using frozen sections for confirmation of tumor-free margins. Wherever tumor abuts against bone, blood vessels or nerves, the respective periosteum, adventitia or perineurium is removed with the operative specimen.

Using this technique, 225 patients with soft tissue sarcoma of an extremity have been treated with a local control rate of greater than 94%. Serious complications requiring reoperation were uncommon and may be related to the dose of irradiation. Amputation is no longer the only method of therapy for soft tissue sarcoma of an extremity. Patients with soft tissue sarcomas of an extremity can be treated with a limb-preserving, multimodality approach that affords a higher local control rate than a surgical procedure alone and preserves a viable, functional extremity in 94% of cases. Additionally, survival is equivalent to that achieved with radical amputation.

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Ex Vivo Renal Artery Reconstruction

THIS YEAR RENAL FAILURE will develop in 15,000 persons, who will then require hemodialysis. With the increasing burden of hemodialysis, there is an impetus to develop new surgical techniques to revascularize kidneys affected by complex renovascular lesions. To salvage these kidneys and maintain renal function, conventional in situ methods are not appropriate, but ex vivo repair, a new technique, permits precise microvascular repair and avoids nephrectomy. "Bench work" surgical intervention describes the sequence of temporary nephrectomy, ex vivo renal perfusion and microvascular repair.

Many indications exist for an ex vivo repair. The most common is the reconstruction of lesions that affect the primary and secondary branch of the renal arteries. The most common cause of these distal lesions is fibromuscular dysplasia. Atherosclerotic renal artery aneurysms occur at this location in the renal artery as well. Additionally, several renal arteries in a donor kidney may require an ex vivo microvascular repair before transplantation. Less frequent indications include excision of bilateral renal parenchymal tumors or a tumor in a solitary kidney, repair of renal or ureteral injuries, removal of multiple or staghorn calculi and repair of a prior renal artery reconstruction that has failed.